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SUBSTITUTE SPECIFICATION

**Data Transmission System Based on Combined Shortwave-Satellite
Transmission**

[0001] This nonprovisional application is a continuation of PCT/EP98/04700 under §371, and claims priority under 35 U.S.C. §119(a) on German Patent Application No. 197 45 573.5 filed in Germany on October 15, 1997, which is herein incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a system for transmitting information to a user via a wideband satellite transmission channel in broadcast operation.

2. Description of the Background Art

[0003] A system of this type is known (Connect magazine, July 1997, p. 74). With this system, information, from the Internet for example, can be transmitted to users very rapidly at high transmission rates. The transmission takes place via television satellites (transponders). A request for desired information by the user takes place as usual via a telephone line.

[0004] Many users cannot use telephone lines for making the request, for example when the user is on a ship or is using an aircraft, or also is so far from

telephone networks that even UHF or VHF communications systems such as mobile telephony devices cannot be utilized.

SUMMARY OF THE INVENTION

[0005] It is therefore an object of this invention to provide reception of Internet information via a satellite transmission channel in broadcast operation even for those users who have no opportunity for such a connection to the Internet by line for example, and those who have only limited opportunities of shortwave communication available to them.

[0006] This object is achieved according to principles of the invention in that users are connected to the Internet via a shortwave radio path on which data are transmitted according to the known TCP/IP protocol.

[0007] The invention takes advantage of the knowledge that such shortwave radio paths in a range of, for example, 1.5 to 30 MHz can be used over vast distances on the entire globe. Such shortwave radio connections, in contrast to wire telephone lines or mobile telephony connections working in the VHF/UHF frequency range, are often unstable, provide very low transfer rates (< 3 Kbit/s) and are most commonly operated in simplex mode. Use of the internationally standardized TCP/IP protocol currently used for data transmission in worldwide communications networks, such as the Internet, which operates in full duplex mode and, as is described for example in the book "Internetworking With TCP/IP" by Douglas E. Comer, Prentice Hall, Englewood Cliffs, New Jersey 07632, has so far been withheld from the shortwave transmission medium. For the purpose of this invention, this TCP/IP protocol is modified and adapted so that it can also be used for the chronologically sequential alternating, forward and backward connection, common in the shortwave range. Such a shortwave connection

transmitting data according to the TCP/IP protocol is therefore also suitable for requesting data on the Internet. An Internet user on a ship who has a shortwave transmitter/receiver device with these properties can, therefore, at any time, for example from an Internet provider, request a specific Internet content via his shortwave connection, and this will then be directly transmitted to him via a wideband satellite transmission channel. Although such shortwave radio connections are relatively narrowband, the opportunity is hereby provided for the first time for even users who do not have any opportunity for a wire connection to an Internet service provider to make use of the possibility of an Internet information transmission with high transfer rates via a satellite transmission channel.

[0008] Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus, are not limitive of the present invention, and wherein:

[0010] The figure is an illustration of a data transmission system according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] The figure shows an Internet service provider 1 that makes available content from the Internet 2 via a satellite transmission path 3, 4, 5 to various users A and B, at a high transmission rate. A suitable decoder 7 is provided in a computer 6 of each user. The data transmission via the satellite transmission path takes place according to the TCP/IP protocol.

[0012] At each user station A and B, a shortwave transmitter/receiver 8 is provided that is connected with a shortwave transmitter/receiver station 9 of a base station Z having Internet access. Suitable shortwave devices 8 and 9 are the XK2000 devices of Rohde & Schwarz, as described, for example, in the data sheet "HF Transceiver Family XK2000". The computers 6 and 10 that control the devices 8 and 9 provide a control program that corresponds to the TCP/IP protocol and is adapted only to the special requirements of a shortwave connection. Thus, the shortwave connection between the devices 8 and 9 functions, exactly as does the satellite transmission path, according to the TCP/IP protocol, and is thus directly suitable for access from stations A and B to the Internet 2, via Z.

[0013] Rather than transmitting large quantities of data over the base station Z via shortwave to the user station A and/or B, this information can be deposited for the user in a so-called mailbox on the Internet. The user stations A and/or B can load this data to their computers via the rapid satellite connection. Both notification of the user stations A and/or B of the deposited message and request for the deposited information on the Internet take place via the shortwave medium.

[0014] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a

departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are to be included within the scope of the following claims.

What is claimed is: